Fig. 1

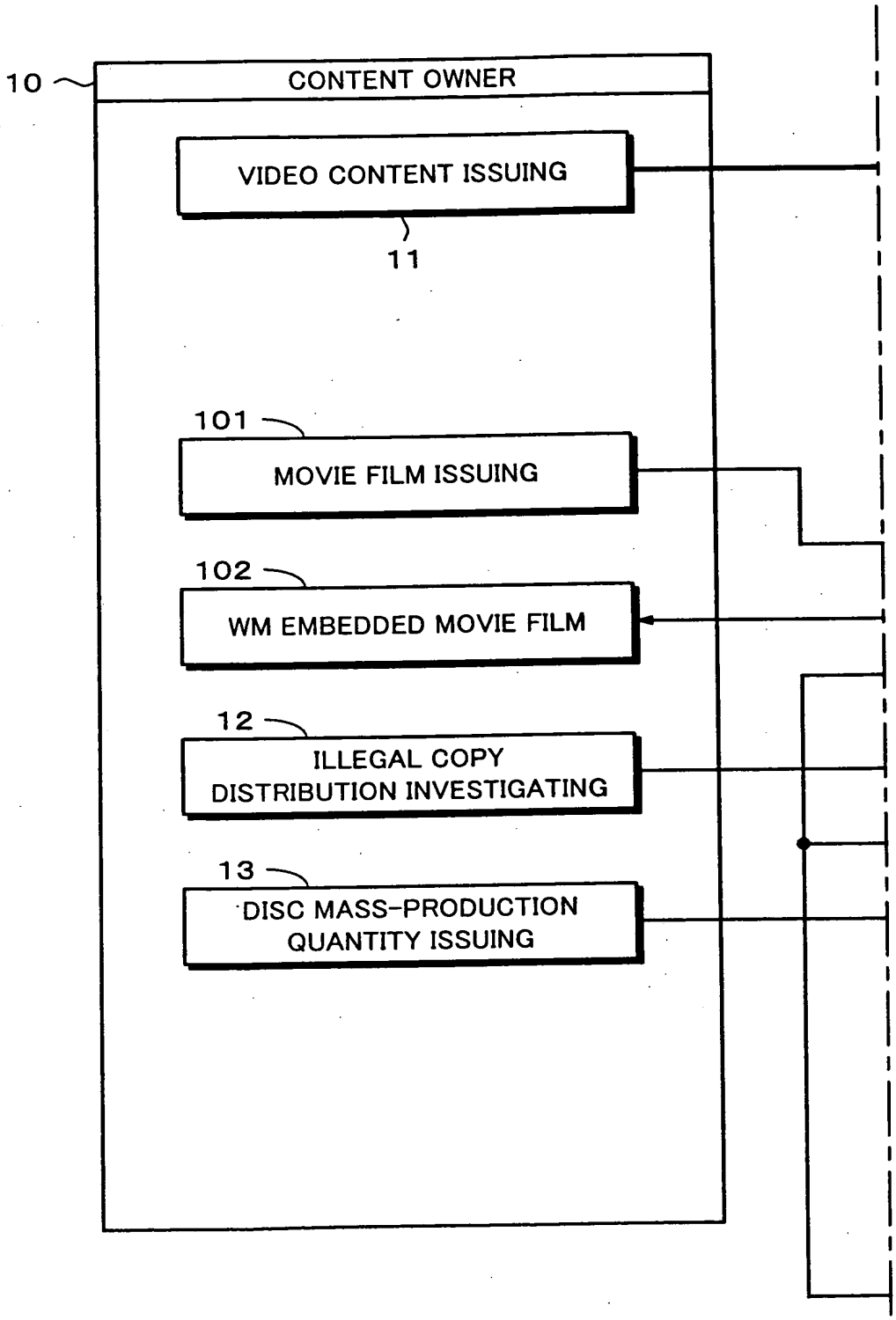
10
CONTENT OWNER
VIDEO CONTENT ISSUING
11
101
MOVIE FILM ISSUING
102
WM EMBEDDED MOVIE FILM
12
ILLEGAL COPY DISTRIBUTION INVESTIGATING
13
DISC MASS-PRODUCTION QUANTITY ISSUING

Fig. 2

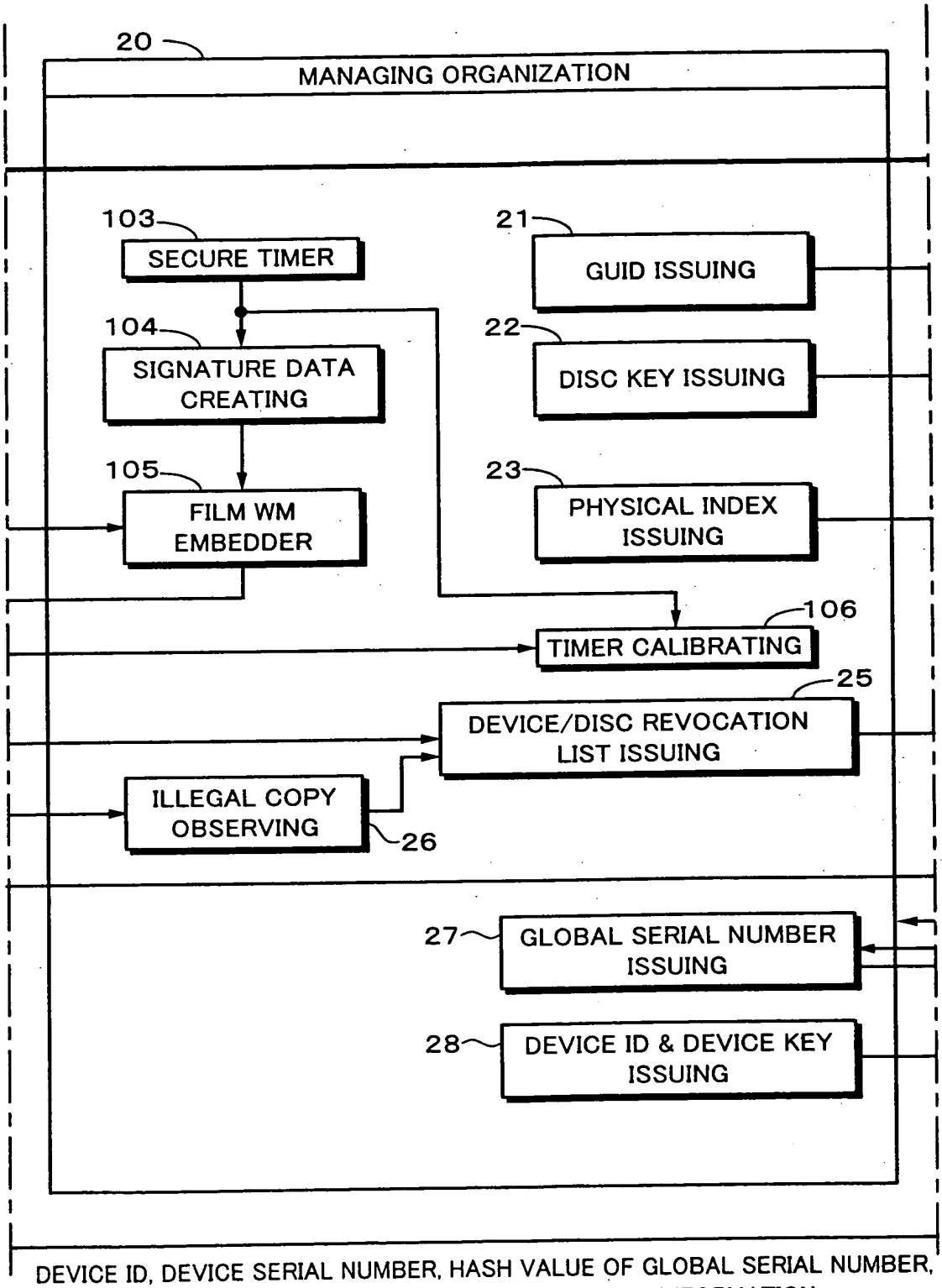
20
MANAGING ORGANIZATION
103
SECURE TIMER
104
SIGNATURE DATA CREATING
105
FILM WM EMBEDDER
21
GUID ISSUING
22
DISC KEY ISSUING
23
PHYSICAL INDEX ISSUING
106
TIMER CALIBRATING
25
DEVICE/DISC REVOCATION LIST ISSUING
ILLEGAL COPY OBSERVING
26
27
GLOBAL SERIAL NUMBER ISSUING
28
DEVICE ID & DEVICE KEY ISSUING
DEVICE ID, DEVICE SERIAL NUMBER, HASH VALUE OF GLOBAL SERIAL NUMBER, TIMER INFORMATION, AND FILM WM STATUS INFORMATION

Fig. 3

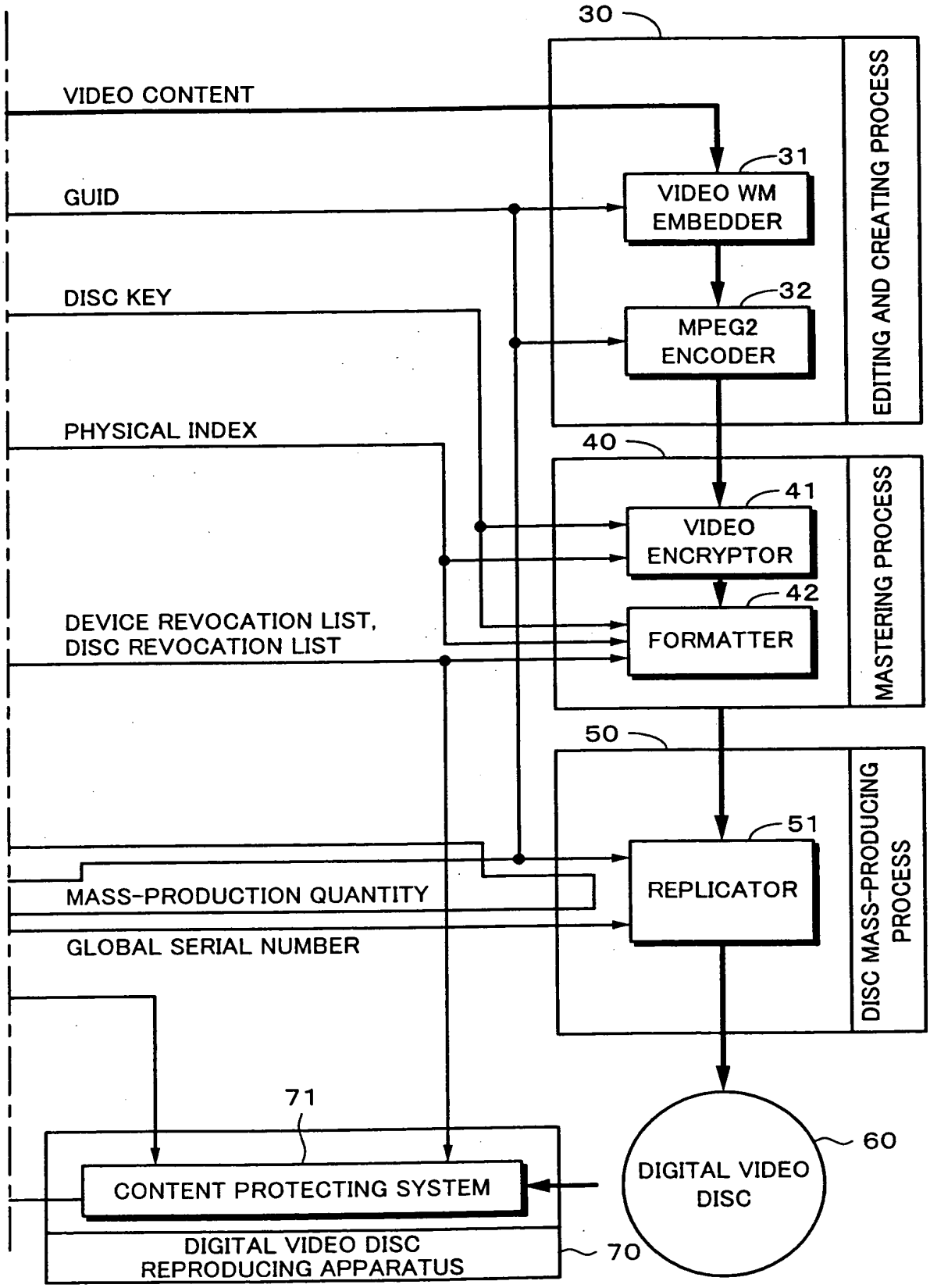
30
VIDEO CONTENT
GUID
DISC KEY
PHYSICAL INDEX
DEVICE REVOCATION LIST,
DISC REVOCATION LIST
MASS-PRODUCTION QUANTITY
GLOBAL SERIAL NUMBER
31
VIDEO WM EMBEDDER
32
MPEG2 ENCODER
EDITING AND CREATING PROCESS
40
41
VIDEO ENCRYPTOR
42
FORMATTER
MASTERING PROCESS
50
51
REPLICATOR
DISC MASS-PRODUCING PROCESS
71
CONTENT PROTECTING SYSTEM
DIGITAL VIDEO DISC REPRODUCING APPARATUS
70
DIGITAL VIDEO DISC
60

Fig. 4

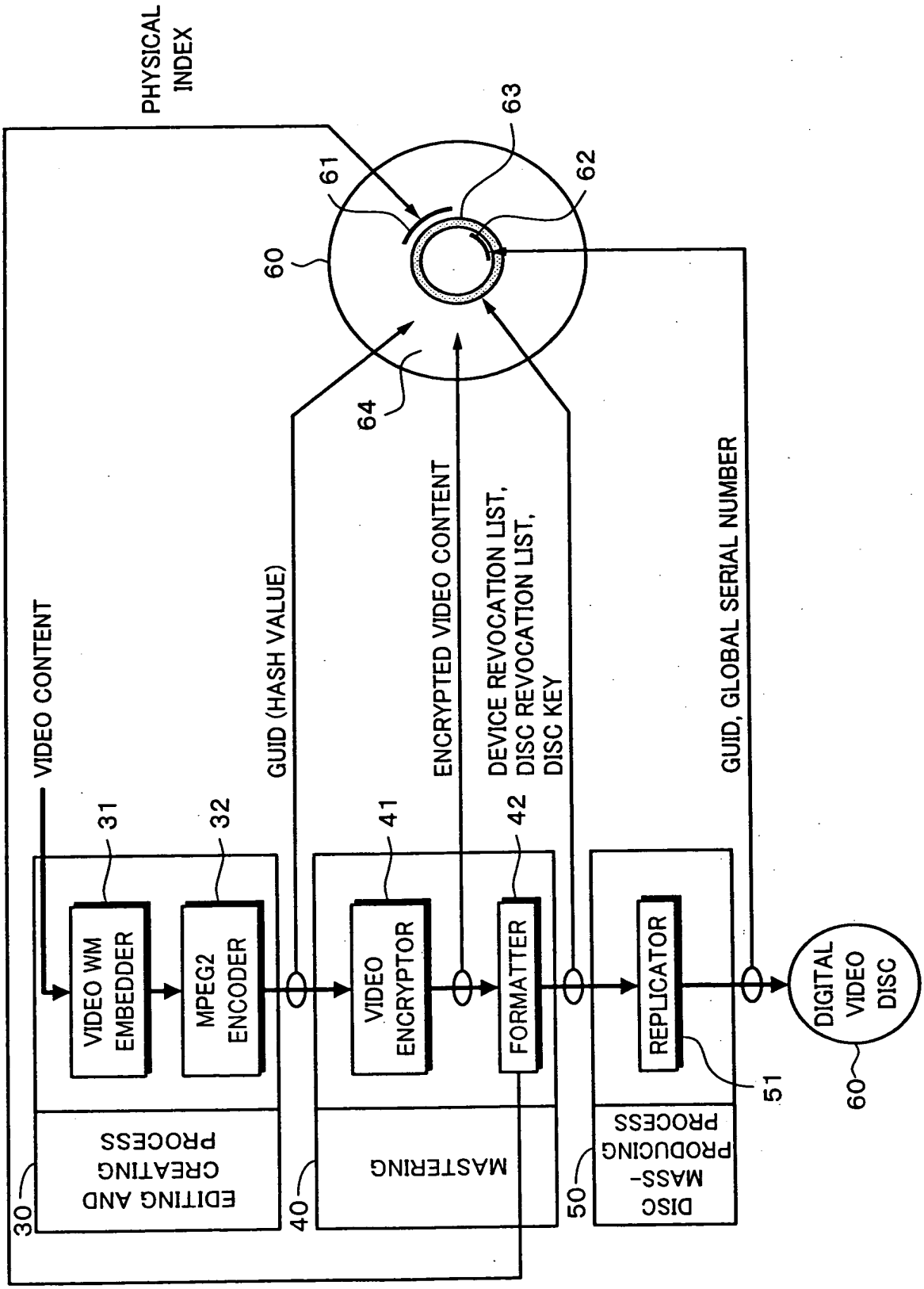
PHYSICAL INDEX
63
61
62
60
64
VIDEO CONTENT
GUID (HASH VALUE)
ENCRYPTED VIDEO CONTENT
DEVICE REVOCATION LIST,
DISC REVOCATION LIST,
DISC KEY
GUID, GLOBAL SERIAL NUMBER
31
32
41
42
VIDEO WM EMBEDDER
MPEG2 ENCODER
VIDEO ENCRYPTOR
FORMATTER
REPLICATOR
DIGITAL VIDEO DISC
60
51
EDITING AND CREATING PROCESS
30
MASTERING
40
DISC MASS-PRODUCING PROCESS
50

Fig. 5

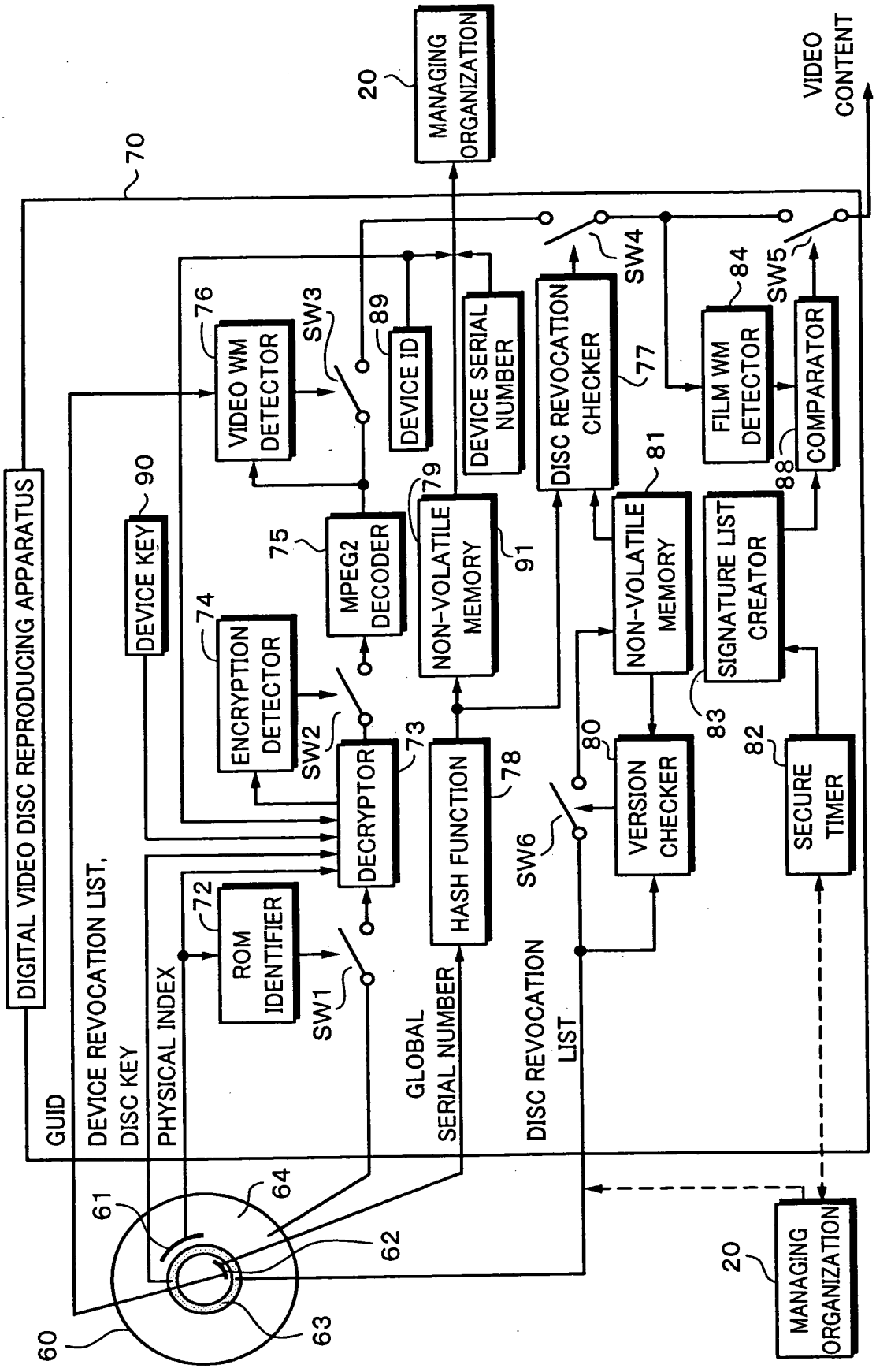
DIGITAL VIDEO DISC REPRODUCING APPARATUS
GUID
DEVICE REVOCATION LIST,
DISC KEY
PHYSICAL INDEX
ROM IDENTIFIER
72
SW1
DECRYPTOR
73
SW2
ENCRYPTION DETECTOR
74
MPEG2 DECODER
75
VIDEO WM DETECTOR
76
SW3
DEVICE KEY
90
DEVICE ID
89
DEVICE SERIAL NUMBER
NON-VOLATILE MEMORY
91
79
HASH FUNCTION
78
GLOBAL SERIAL NUMBER
DISC REVOCATION CHECKER
77
SW4
DISC REVOCATION LIST
SW6
VERSION CHECKER
80
NON-VOLATILE MEMORY
81
SECURE TIMER
82
SIGNATURE LIST CREATOR
83
FILM WM DETECTOR
84
SW5
COMPARATOR
88
MANAGING ORGANIZATION
20
MANAGING ORGANIZATION
20
VIDEO CONTENT
70
60
61
62
63
64

Fig. 6

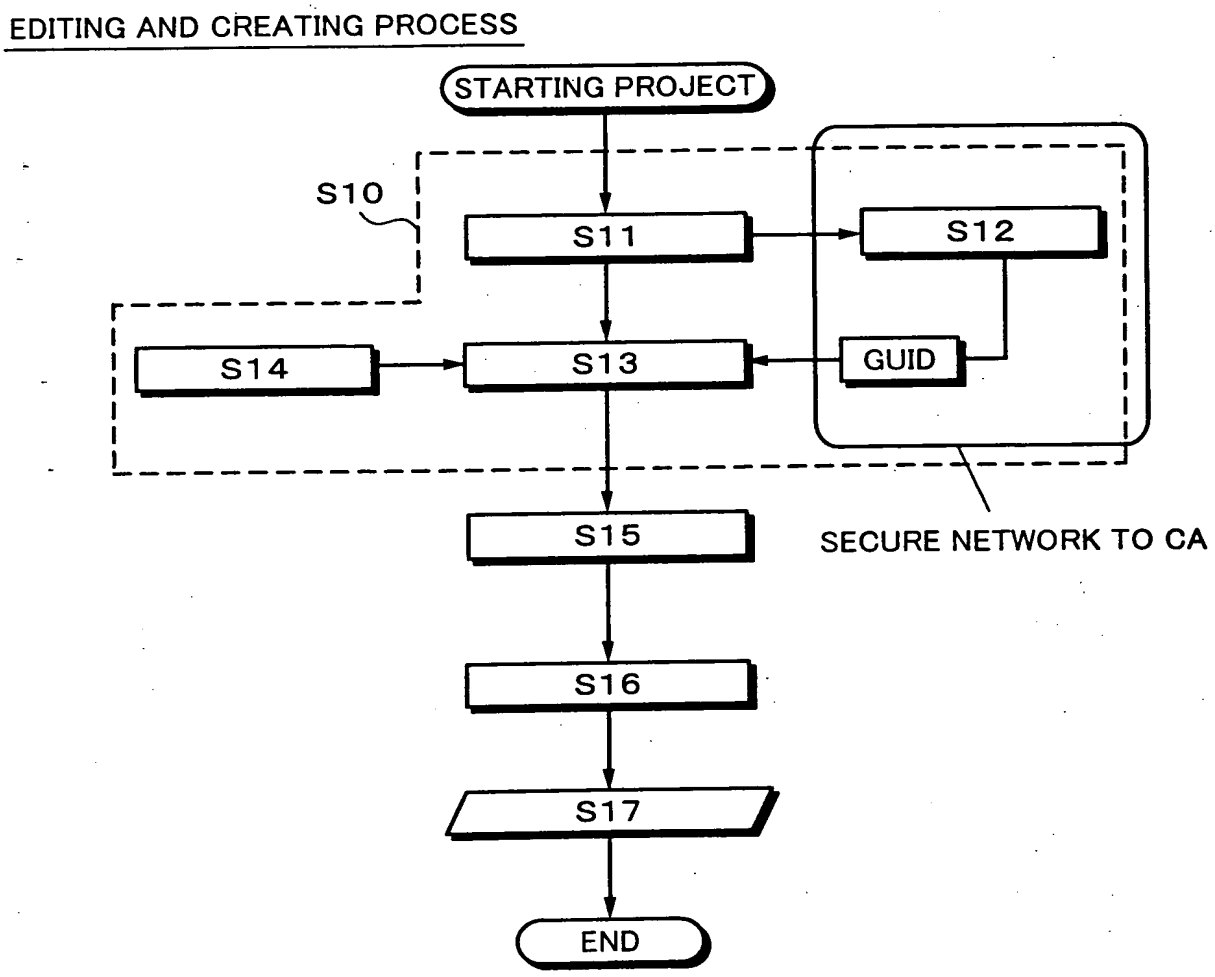
EDITING AND CREATING PROCESS
STARTING PROJECT
S10
S11
S12
S14
S13
GUID
S15
SECURE NETWORK TO CA
S16
S17
END

Fig. 7

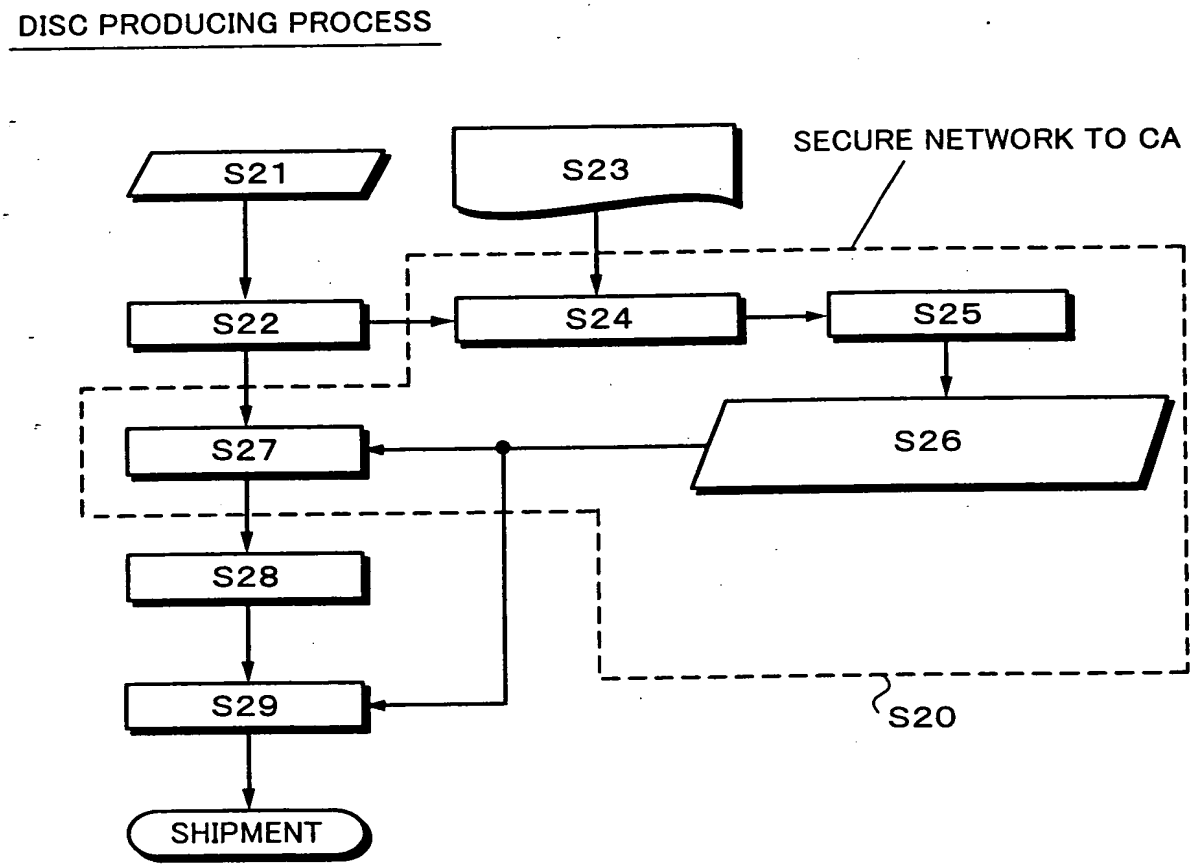
DISC PRODUCING PROCESS
SECURE NETWORK TO CA
S21
S23
S22
S24
S25
S27
S26
S28
S29
S20
SHIPMENT

Fig. 8

DISC REPRODUCING APPARATUS

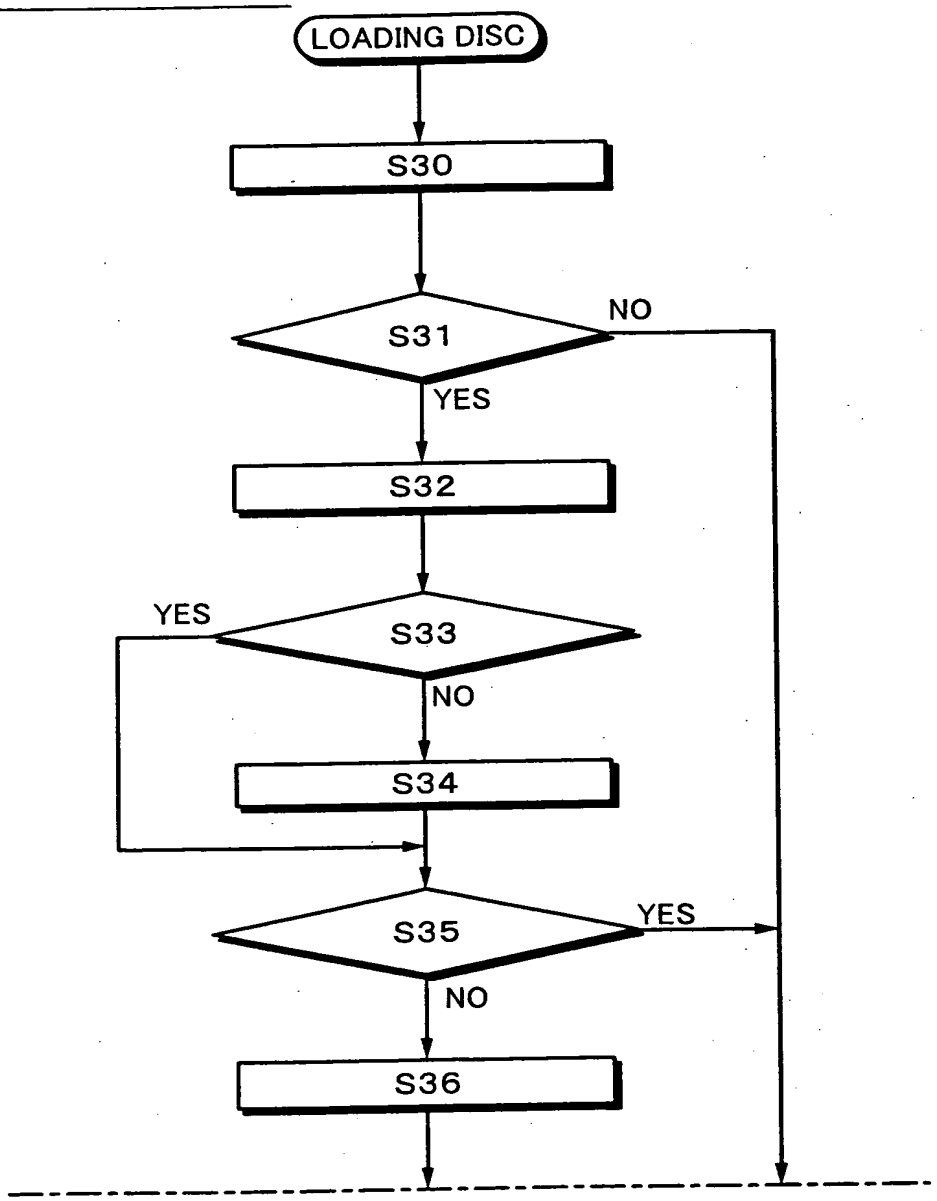

Fig. 9

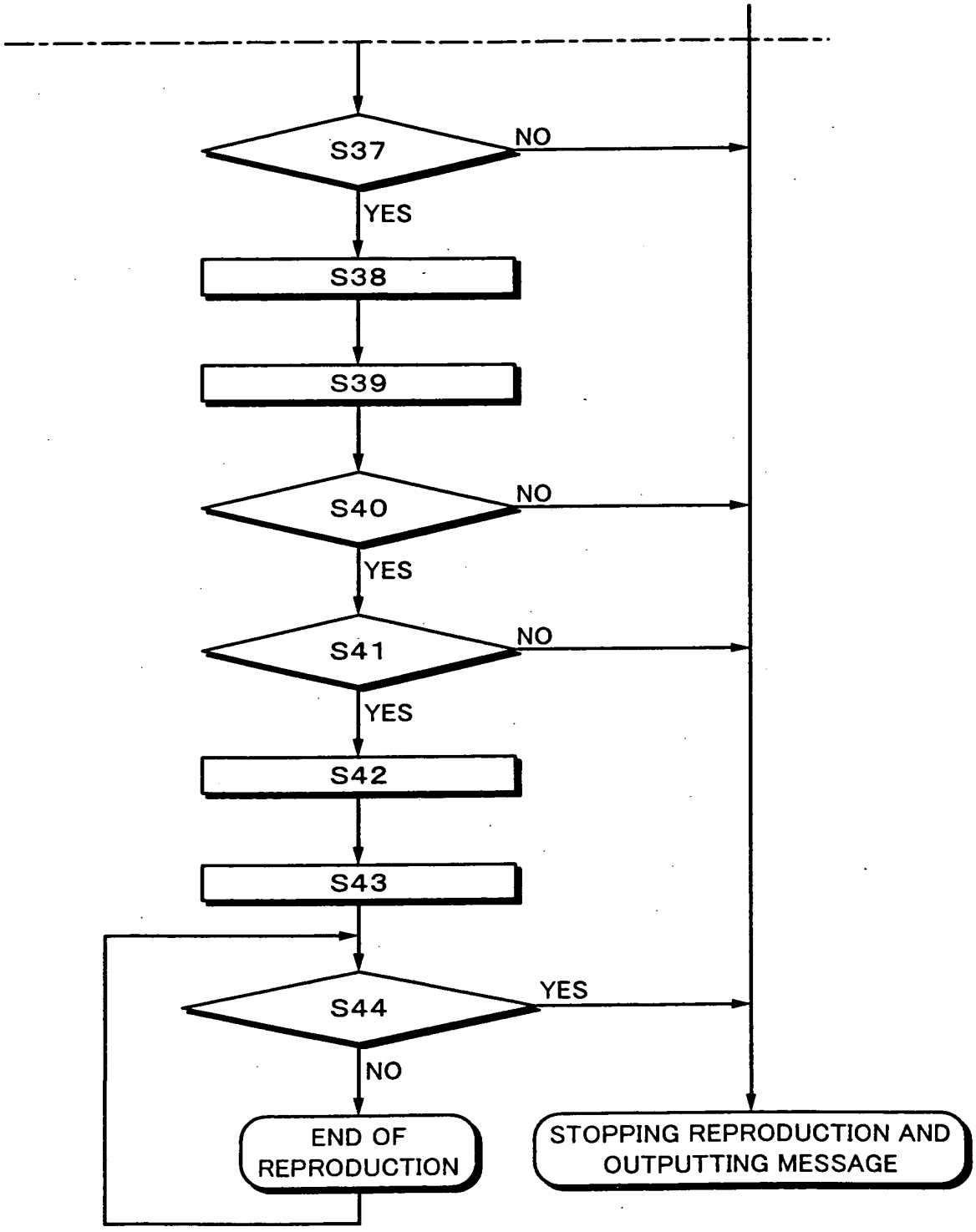
S37
NO
YES
S38
S39
S40
NO
YES
S41
NO
YES
S42
S43
S44
YES
NO
END OF REPRODUCTION
STOPPING REPRODUCTION AND OUTPUTTING MESSAGE

Fig. 10

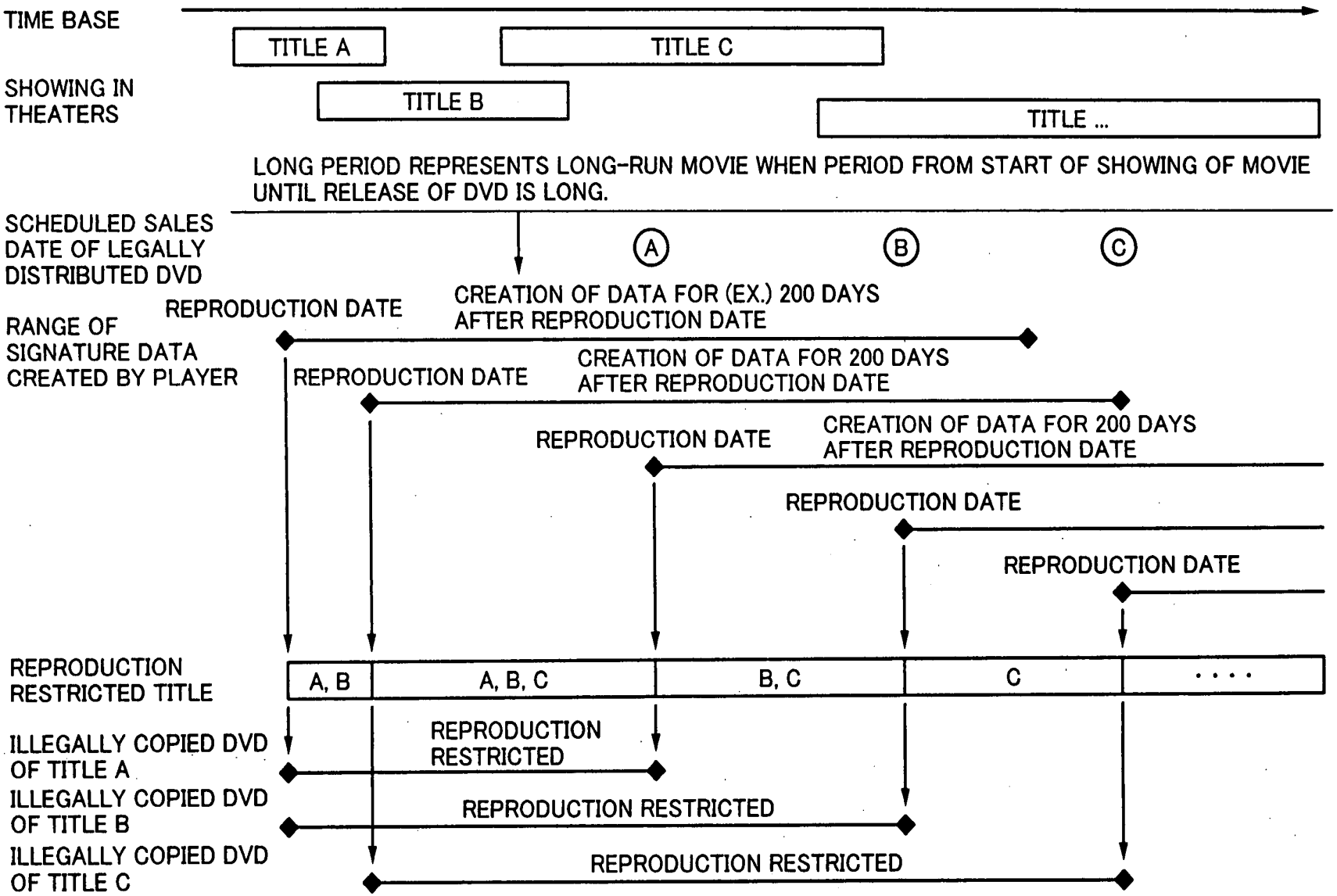

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Fig. 11

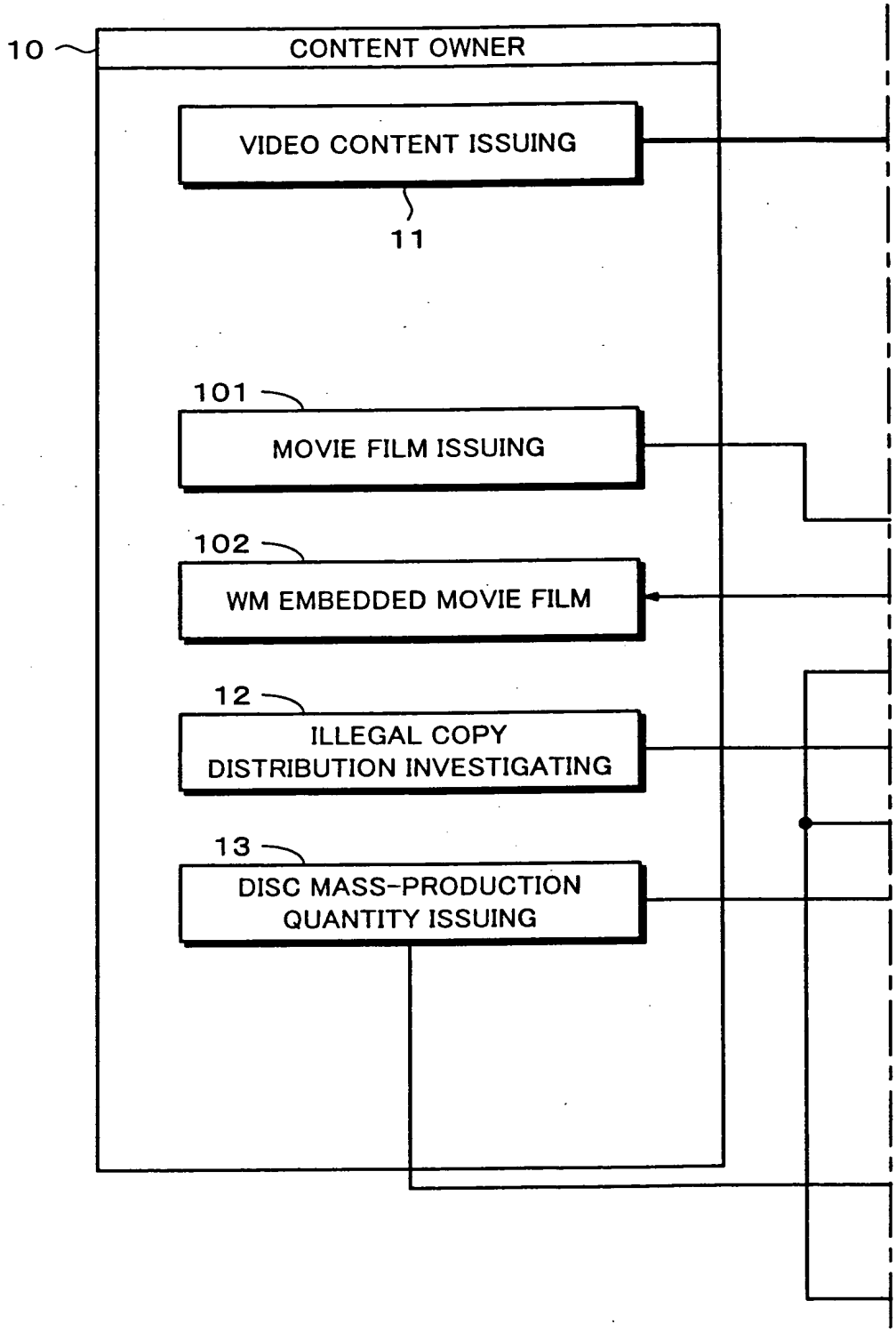

10
CONTENT OWNER
VIDEO CONTENT ISSUING
11
101
MOVIE FILM ISSUING
102
WM EMBEDDED MOVIE FILM
12
ILLEGAL COPY DISTRIBUTION INVESTIGATING
13
DISC MASS-PRODUCTION QUANTITY ISSUING

Fig. 12

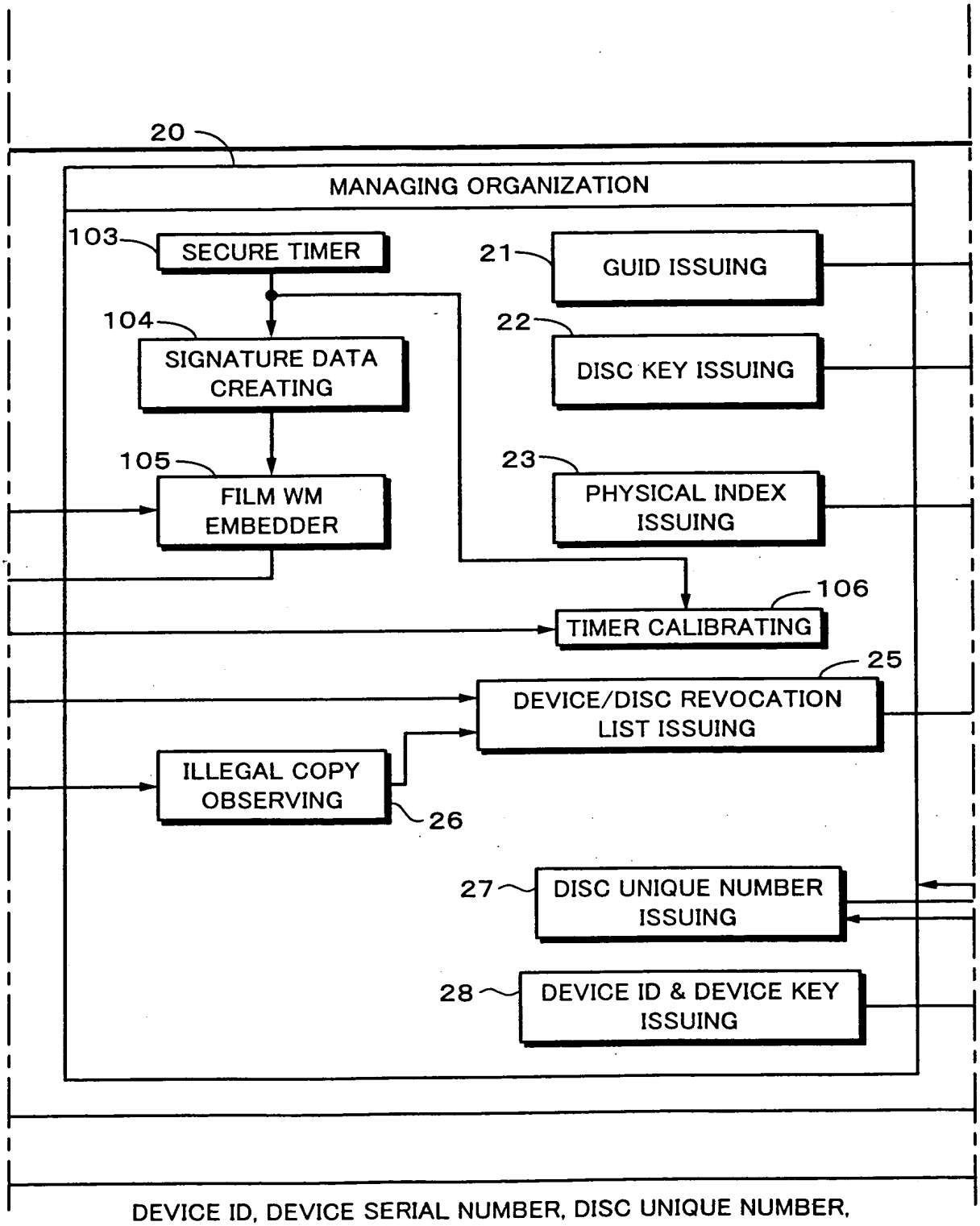

20
MANAGING ORGANIZATION
103
SECURE TIMER
104
SIGNATURE DATA CREATING
105
FILM WM EMBEDDER
21
GUID ISSUING
22
DISC KEY ISSUING
23
PHYSICAL INDEX ISSUING
106
TIMER CALIBRATING
25
DEVICE/DISC REVOCATION LIST ISSUING
ILLEGAL COPY OBSERVING
26
27
DISC UNIQUE NUMBER ISSUING
28
DEVICE ID & DEVICE KEY ISSUING
DEVICE ID, DEVICE SERIAL NUMBER, DISC UNIQUE NUMBER, TIMER INFORMATION, AND FILM WM STATUS INFORMATION

Fig. 13

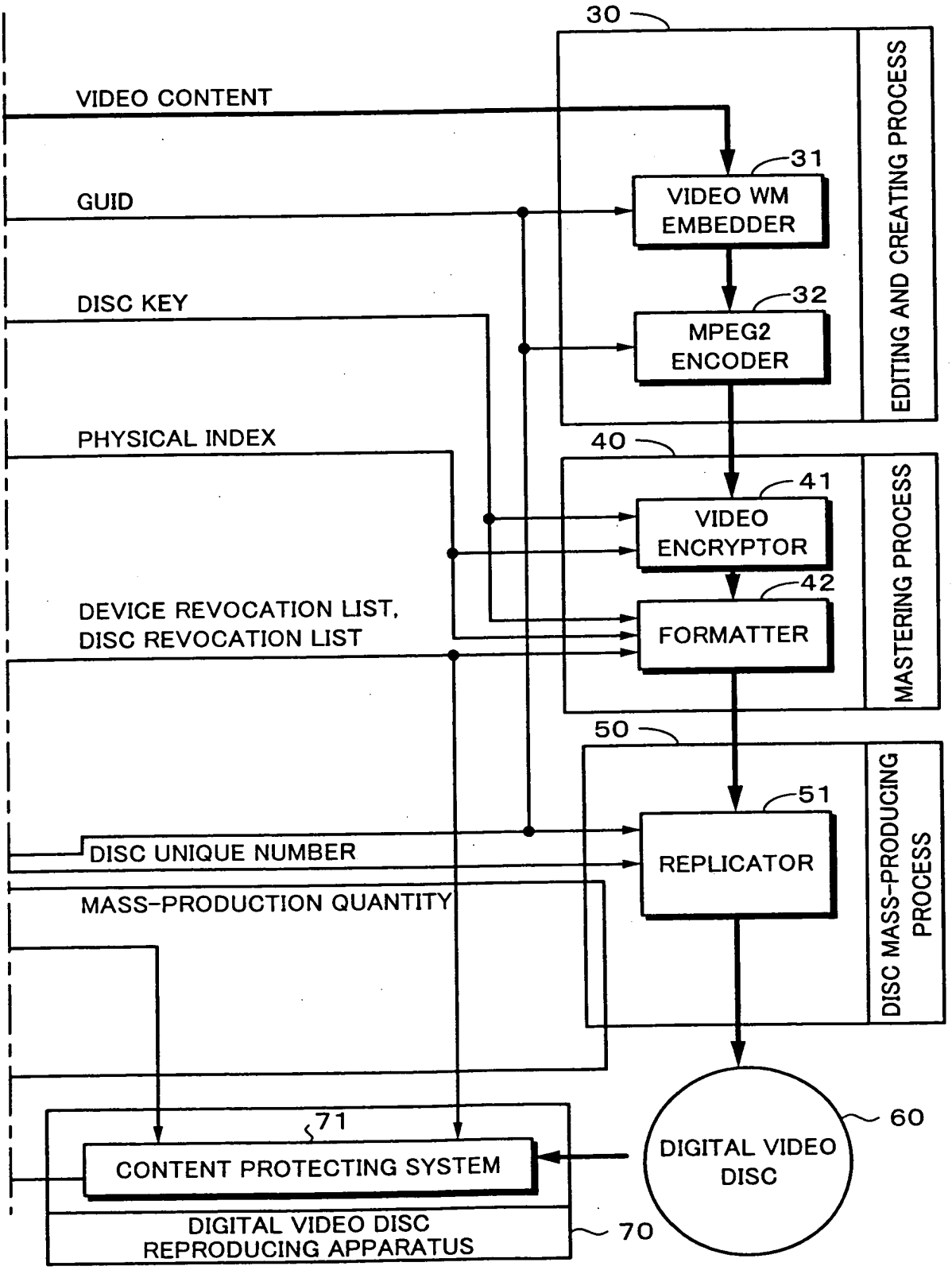

30
VIDEO CONTENT
GUID
DISC KEY
PHYSICAL INDEX
DEVICE REVOCATION LIST,
DISC REVOCATION LIST
DISC UNIQUE NUMBER
MASS-PRODUCTION QUANTITY
31
VIDEO WM EMBEDDER
32
MPEG2 ENCODER
EDITING AND CREATING PROCESS
40
41
VIDEO ENCRYPTOR
42
FORMATTER
MASTERING PROCESS
50
51
REPLICATOR
DISC MASS-PRODUCING PROCESS
60
DIGITAL VIDEO DISC
71
CONTENT PROTECTING SYSTEM
DIGITAL VIDEO DISC REPRODUCING APPARATUS
70

Fig. 14

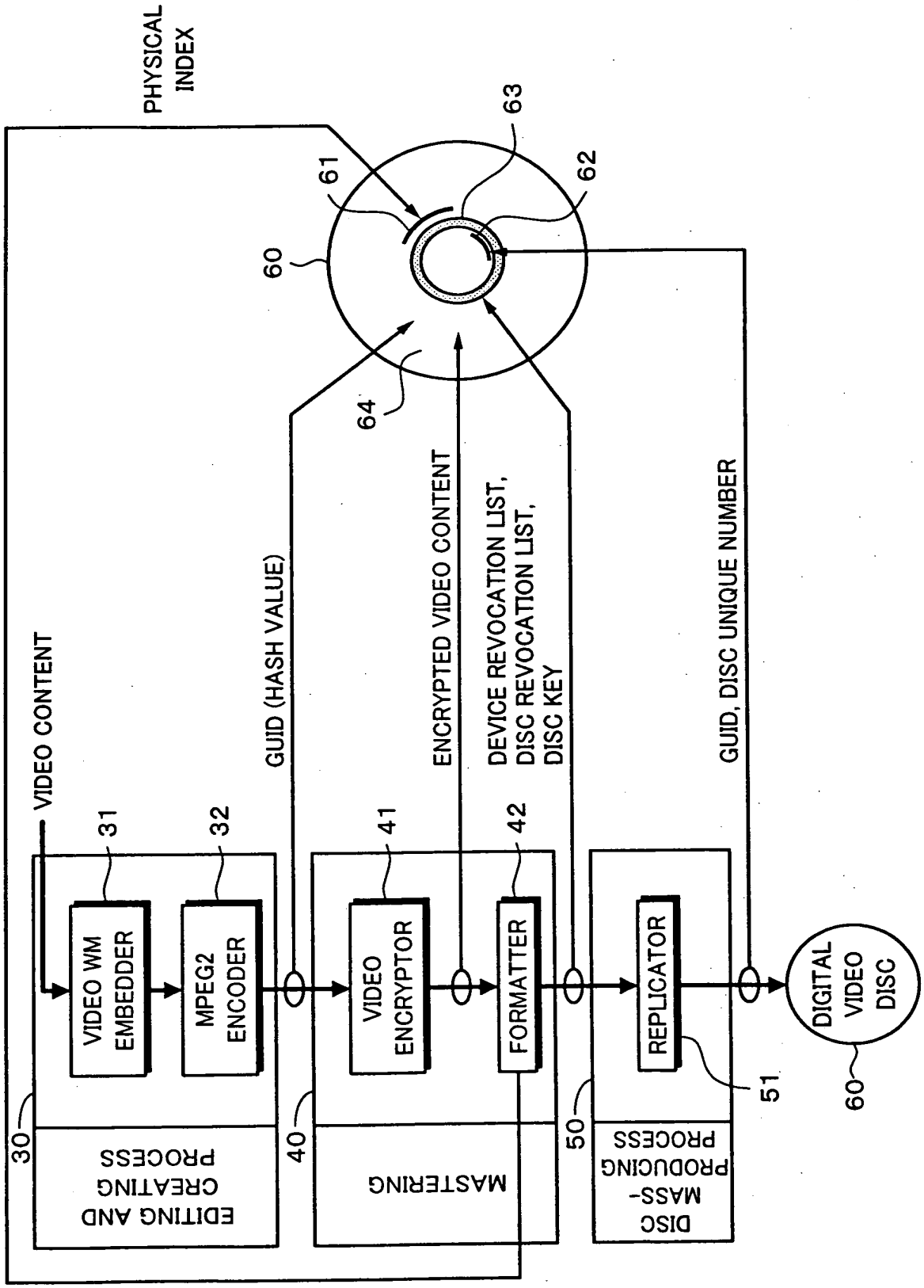

PHYSICAL INDEX
63
61
62
60
64
VIDEO CONTENT
GUID (HASH VALUE)
ENCRYPTED VIDEO CONTENT
DEVICE REVOCATION LIST, DISC REVOCATION LIST, DISC KEY
GUID, DISC UNIQUE NUMBER
31
32
41
42
VIDEO WM EMBEDDER
MPEG2 ENCODER
VIDEO ENCRYPTOR
FORMATTER
REPLICATOR
DIGITAL VIDEO DISC
60
51
30
40
50
EDITING AND CREATING PROCESS
MASTERING
DISC MASS-PRODUCING PROCESS

Fig. 15

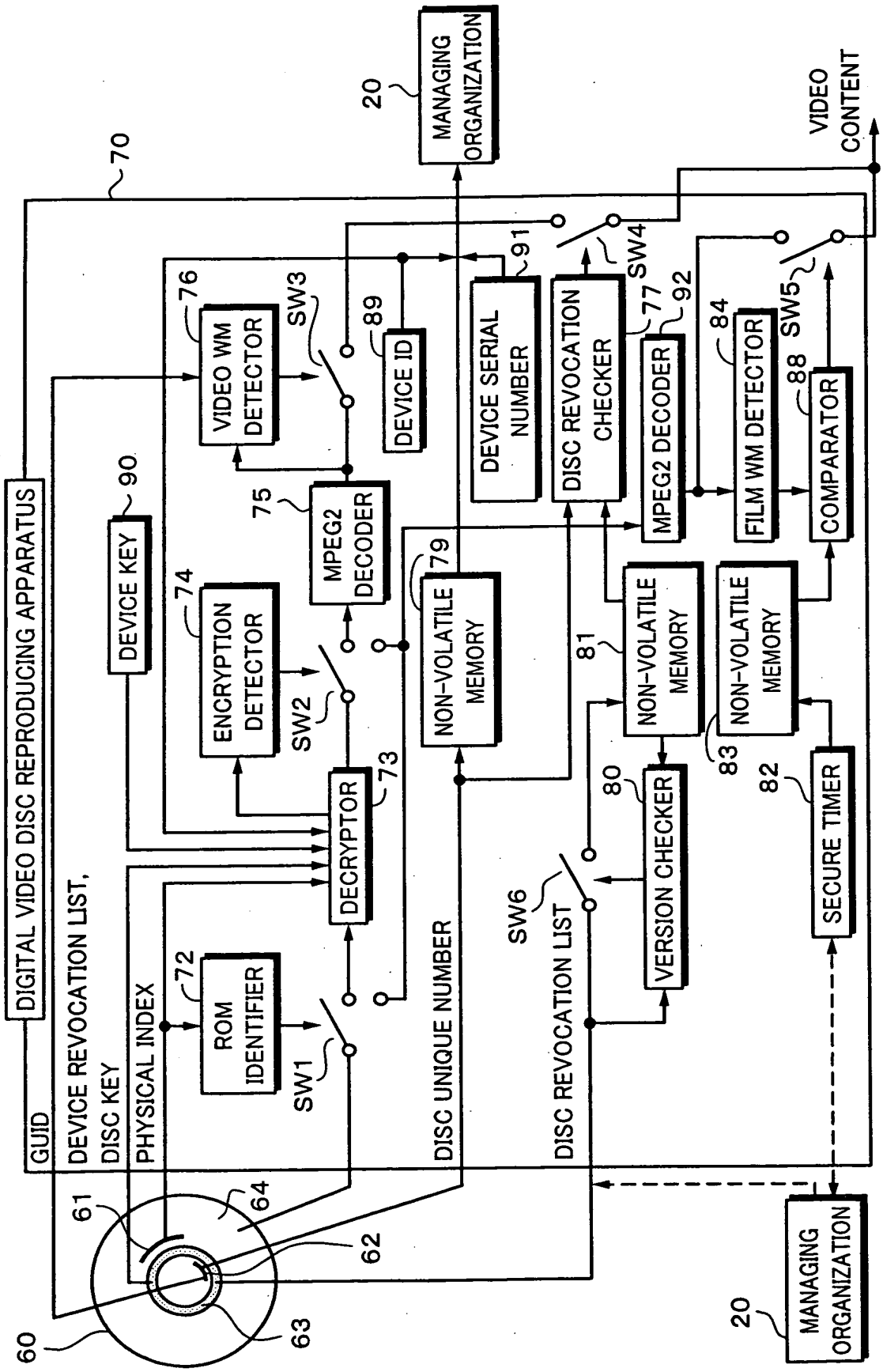

MANAGING ORGANIZATION
20
VIDEO CONTENT
70
DIGITAL VIDEO DISC REPRODUCING APPARATUS
GUID
DEVICE REVOCATION LIST,
DISC KEY
PHYSICAL INDEX
DISC UNIQUE NUMBER
DISC REVOCATION LIST
VIDEO WM DETECTOR
76
SW3
DEVICE ID
89
DEVICE SERIAL NUMBER
91
DISC REVOCATION CHECKER
77
SW4
92
MPEG2 DECODER
84
FILM WM DETECTOR
SW5
88
COMPARATOR
DEVICE KEY
90
MPEG2 DECODER
75
ENCRYPTION DETECTOR
74
SW2
NON-VOLATILE MEMORY
79
NON-VOLATILE MEMORY
81
NON-VOLATILE MEMORY
83
DECRYPTOR
73
ROM IDENTIFIER
72
SW1
SW6
VERSION CHECKER
80
SECURE TIMER
82
61
64
62
63
60
MANAGING ORGANIZATION
20

Fig. 16

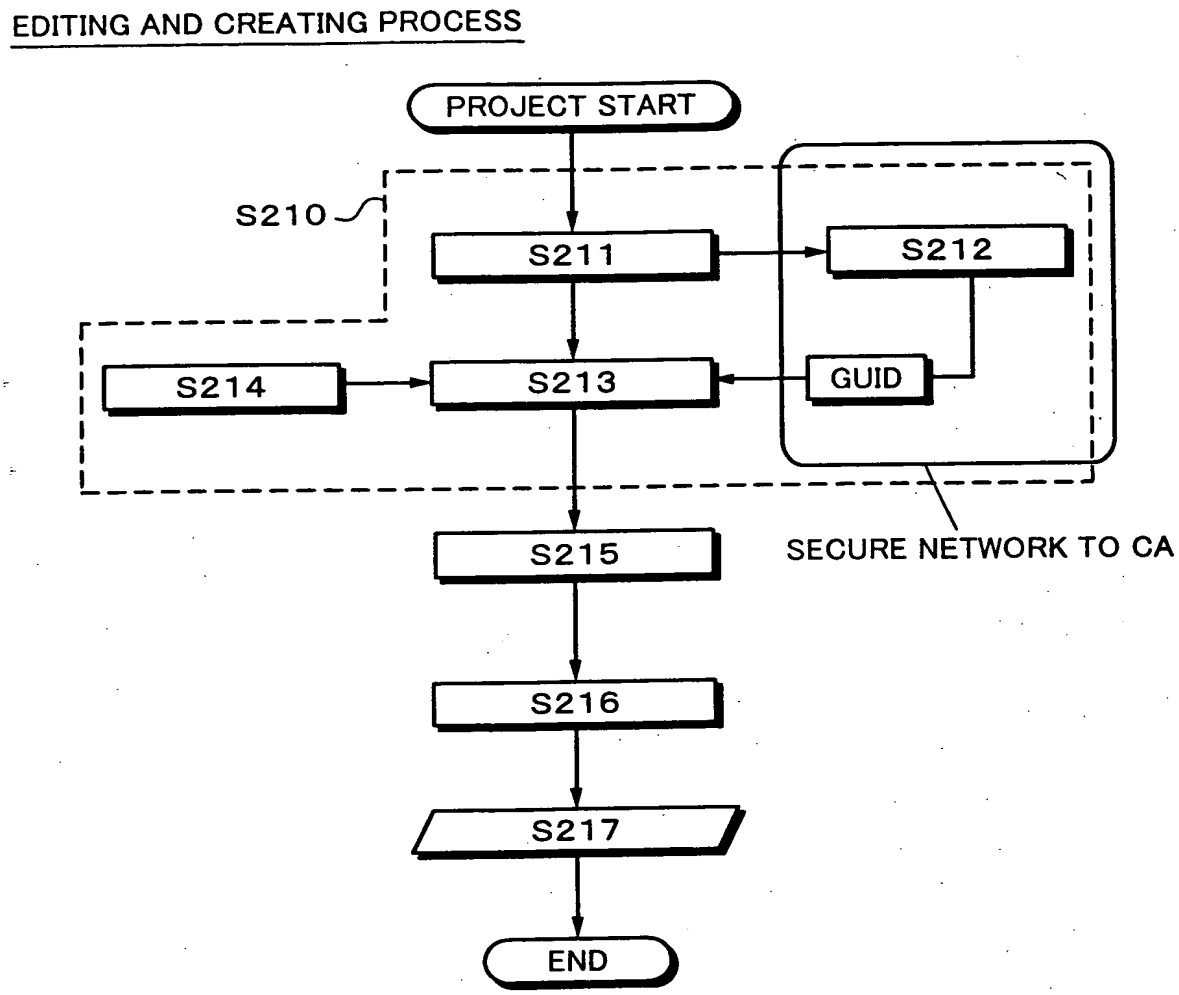

EDITING AND CREATING PROCESS
PROJECT START
S210
S211
S212
S214
S213
GUID
S215
SECURE NETWORK TO CA
S216
S217
END

Fig. 17

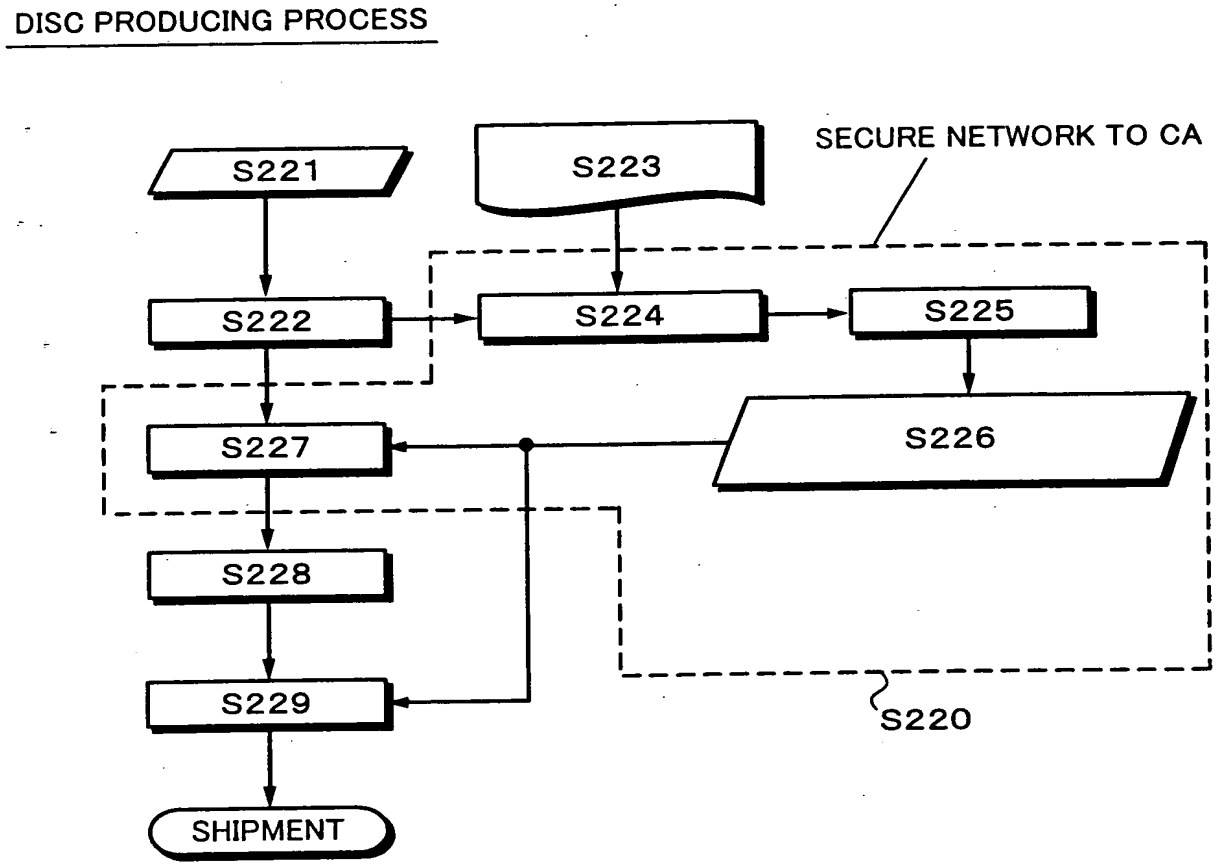

DISC PRODUCING PROCESS
S221
S223
SECURE NETWORK TO CA
S222
S224
S225
S226
S227
S228
S229
SHIPMENT
S220

Fig. 18

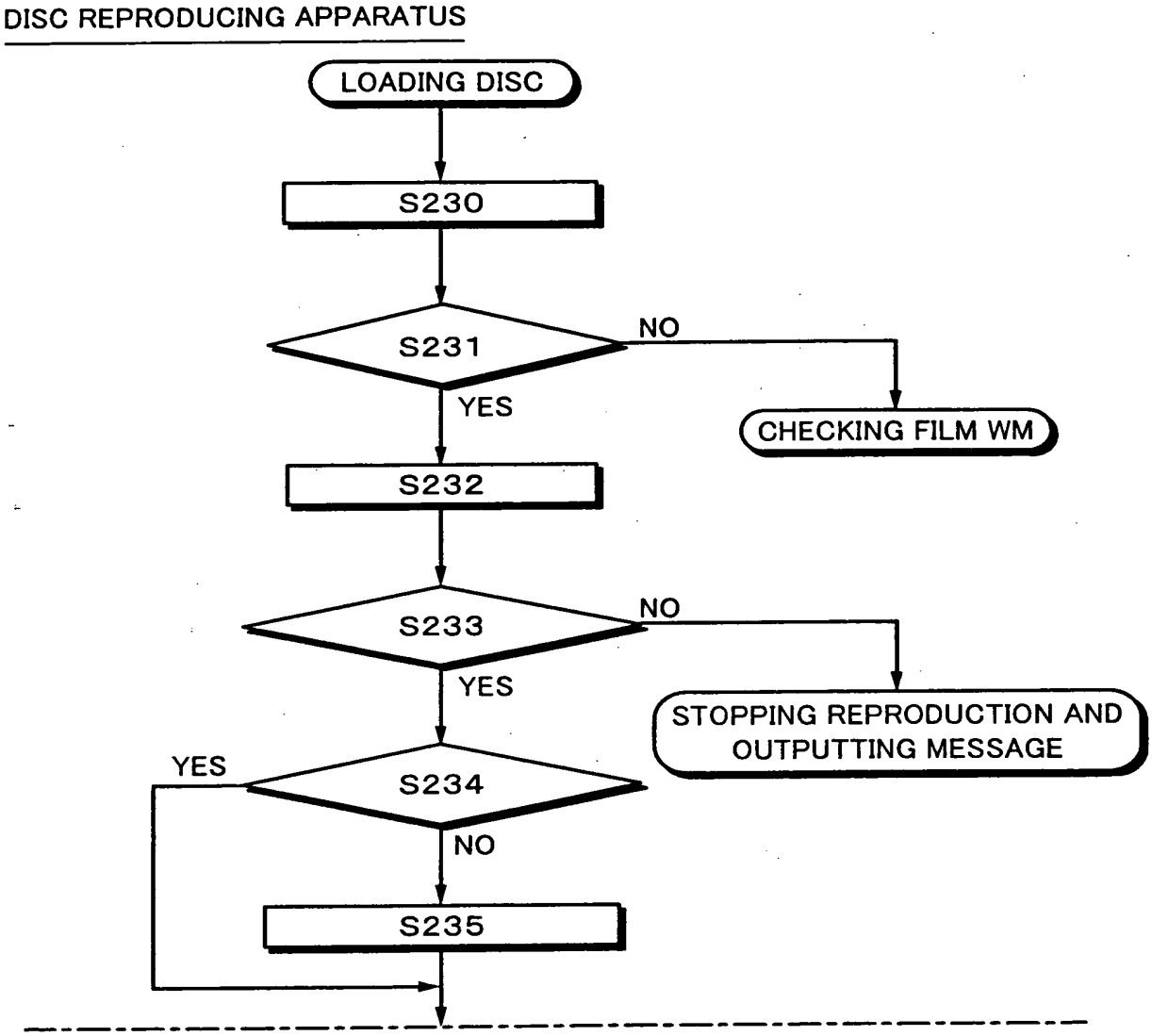

DISC REPRODUCING APPARATUS
LOADING DISC
S230
S231
NO
YES
CHECKING FILM WM
S232
S233
NO
YES
STOPPING REPRODUCTION AND OUTPUTTING MESSAGE
YES
S234
NO
S235

Fig. 19

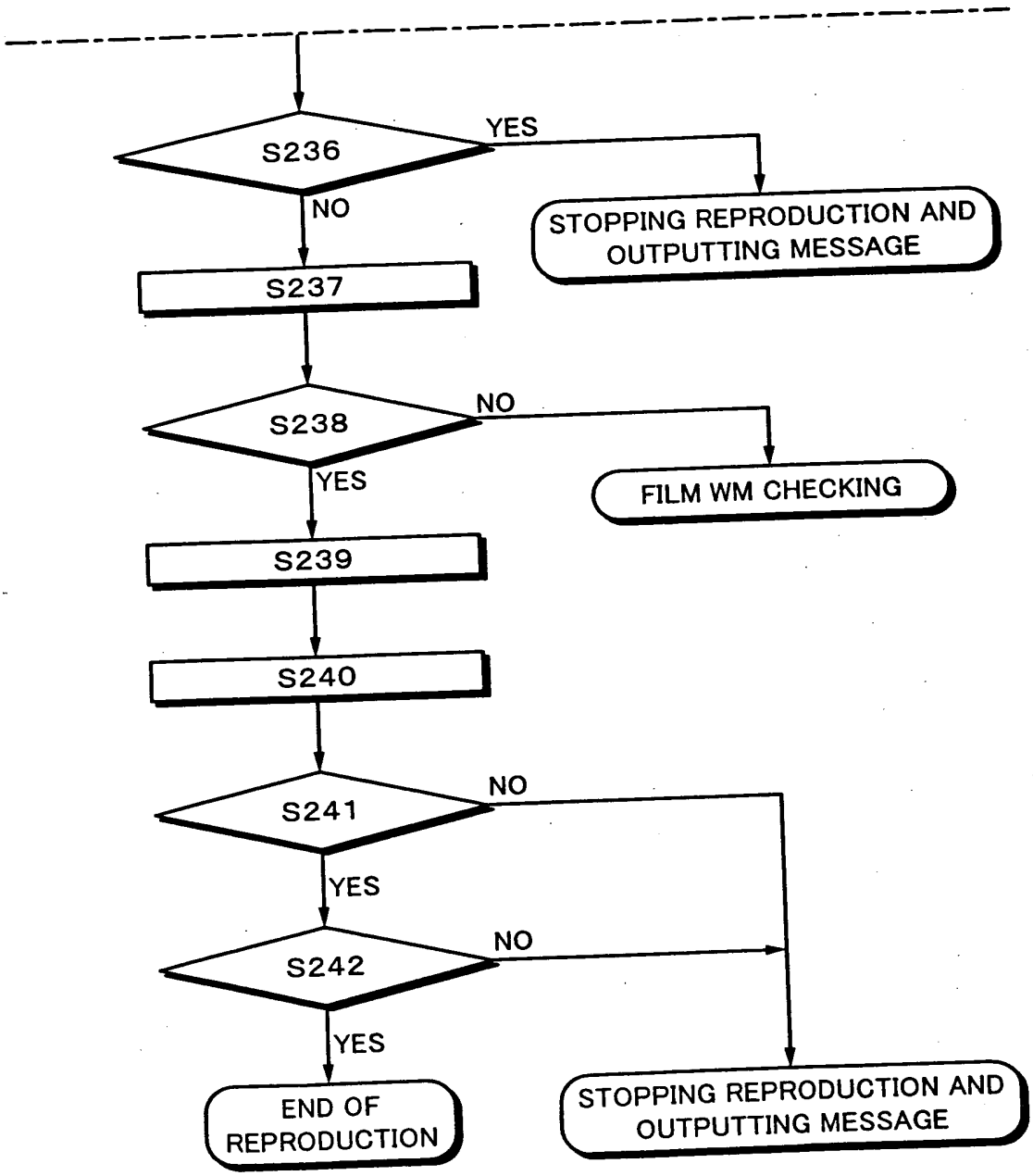
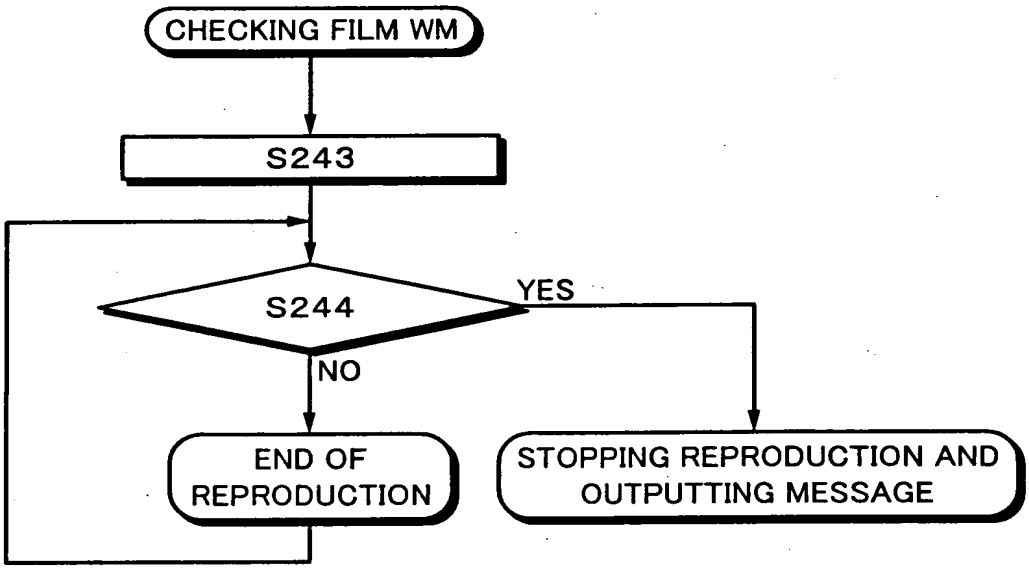

S236
YES
NO
STOPPING REPRODUCTION AND OUTPUTTING MESSAGE
S237
S238
NO
YES
FILM WM CHECKING
S239
S240
S241
NO
YES
S242
NO
YES
END OF REPRODUCTION
STOPPING REPRODUCTION AND OUTPUTTING MESSAGE

Fig. 20


CHECKING FILM WM
S243
S244
YES
NO
END OF REPRODUCTION
STOPPING REPRODUCTION AND OUTPUTTING MESSAGE

DESCRIPTION OF REFERENCE NUMERALS

10	CONTENT OWNER
20	MANAGING ORGANIZATION
30	EDITING AND CREATING PROCESS
40	MASTERING PROCESS
50	DISC MASS-PRODUCING PROCESS
60	DIGITAL VIDEO DISC
70	DIGITAL VIDEO DISC REPRODUCING APPARATUS
61	PHYSICAL WATERMARK
62	BCA
63	LEAD-IN AREA
64	DATA AREA
72	ROM IDENTIFIER
74	ENCRYPTION DETECTOR
76	VIDEO ELECTRONIC WATERMARK DETECTOR
77	DISC REVOCATION CHECKER
79, 81	NON-VOLATILE MEMORY
80	VERSION CHECKER
82	SECURE TIMER
83	SIGNATURE LIST CREATOR
84	FILM ELECTRONIC WATERMARK DETECTOR
88	COMPARATOR
S11	REQUEST CA TO ISSUE GUID.
S12	ISSUE GUID.
S13	EMBED VIDEO WM.

S14 PROVIDE VIDEO WM.

S15 ENCODE AUDIO, ETC.

S16 MULTIPLEX AND INSERT GUID.

S17 WRITE DISC IMAGE TO MASTER FORMAT.

S21 RECEIVE DISC IMAGE.

S22 EXTRACT GUID.

S23 DESIGNATE DISC PRODUCTION QUANTITY FOR ORDER (n = MASS-PRODUCTION QUANTITY)

S24 SEND GUID AND REQUEST SERIAL NUMBER.

S25 MANAGING ORGANIZATION

S26 AUTHORIZE PRODUCTION FOR DISCS (1. TRANSFER DISC KEY AND PHYSICAL INDEX, 2. TRANSFER SERIAL NUMBER, DEVICE REVOCATION LIST, AND DISC REVOCATION LIST).

S27 PRODUCE DISC MASTER.

S28 REPLICATION

S29 POST MARK WITH UNIQUE ID (GUID, GLOBAL SERIAL NUMBER).

S30 READ PHYSICAL INDEX.

S31 DETECTED ?

S32 READ BCA (GUID AND GLOBAL SERIAL NUMBER).

S33 HAS SAME SERIAL NUMBER BEEN STORED ?

S34 STORE SERIAL NUMBER.

S35 HAS SERIAL NUMBER BEEN REVOKED ?

S36 READ LEAD-IN AREA (DEVICE REVOCATION LIST, DISC REVOCATION LIST, AND DISC KEY).

S37 ENCRYPTED?

S38 UPDATE DISC REVOCATION LIST.

S39 START REPRODUCING.

S40 HAS VIDEO WM BEEN DETECTED ?

S41 WM = HASH VALUE OF GUID ?

S42 CONTINUE REPRODUCTION.

S43 CREATE SIGNATURE LIST AND COMPARE WITH FILM WM STATUS.

S44 DOES STATUS MATCH SIGNATURE LIST ?

S211 REQUEST CA TO ISSUE GUID.

S212 ISSUE GUID.

S213 EMBED VIDEO WM.

S214 PROVIDE VIDEO WM.

S215 ENCODE AUDIO, ETC.

S216 MULTIPLEX AND INSERT GUID.

S217 WRITE DISC IMAGE TO MASTER FORMAT.

S221 RECEIVE DISC IMAGE.

S222 EXTRACT GUID.

S223 DESIGNATE DISC PRODUCTION QUANTITY FOR ORDER (n = MASS-PRODUCTION QUANTITY)

S224 SEND GUID AND REQUEST DISC UNIQUE NUMBER.

S225 MANAGING ORGANIZATION

S226 AUTHORIZE PRODUCTION FOR DISCS (1. TRANSFER DISC KEY AND PHYSICAL INDEX, 2. TRANSFER UNIQUE NUMBER, DEVICE REVOCATION LIST, AND DISC REVOCATION LIST).

S227 CREATE DISC MASTER.

S228 REPLICATION

S229 POST MARK WITH UNIQUE ID (GUID AND DISC UNIQUE NUMBER).

S230 READ PHYSICAL INDEX.

S231 DETECTED ?

S232 READ BCA (GUID AND DISC UNIQUE NUMBER).

S233 HAS DISC UNIQUE NUMBER BEEN CHECKED ?

S234 HAS SAME UNIQUE NUMBER BEEN STORED ?

S235 STORE UNIQUE NUMBER.

S236 HAS UNIQUE NUMBER BEEN REVOKED ?

S237 READ LEAD-IN AREA (DEVICE REVOCATION LIST, DISC REVOCATION LIST, AND DISC KEY).

S238 ENCRYPTED ?

S239 UPDATE DISC REVOCATION LIST.

S240 START REPRODUCING.

S241 HAS VIDEO WM BEEN DETECTED ?

S242 WM = HASH VALUE OF GUID ?

S243 CREATE SIGNATURE LIST AND COMPARE WITH FILM WM STATUS.

S244 DOES STATUS MATCH SIGNATURE LIST ?